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## MESSAGING AND PROMOTION FOR DIGITAL AUDIO MEDIA PLAYERS

### FIELD OF THE INVENTION

The primary fields of the invention are messaging, promotion and digital audio media players.

### BACKGROUND OF THE INVENTION

Digital media players are a widely used form of audio reproduction. In the home, players that play CDs (compact discs) are widely used, and more recently DVD (digital versatile disc) players capable of playing CDs serve the joint function of video and audio playback. Portable audio disc players are also used by many persons on a regular basis. The disc players typically play CDs (compact discs) or MDs (mini discs). Digital audio tape (DAT) players exist, but are used less frequently. The CD format is currently the most popular digital audio format.

A pre-recorded CD or MD contains control code information concerning the audio tracks recorded onto it. The control code information is recorded on channels separate from the main audio channels. Control code information includes Table of Contents (TOC) information. The TOC is recorded at the beginning of the disc in a lead-in area. TOC data is also known as mode 1 of a "Q" channel. TOC information includes: number of tracks, absolute starting time of each track, track number, index numbers within a track, time within a track, and absolute time. Other control code information is recorded in a "P" code channel. The P channel contains a flag bit that designates the start of a track. The length of

1 a start flag is a minimum of two seconds, but equals the pause length between two tracks if  
2 this length exceeds two seconds. More generally, digital audio media of any form can be  
3 expected to have control code information concerning, at least, track starting locations.

#### 4 SUMMARY OF THE INVENTION

5 The present invention makes use of such information as a means to provide  
6 messaging and promotion to users of digital audio media players, and is especially suited to  
7 provide messaging to users of portable digital audio media players, such as digital disc and  
8 tape players. Track start locations provide sufficient information for use of the basic  
9 invention, while preferred optional features may be realized with digital media formats  
10 including additional information.

11 The present invention provides messaging, such as promotional messaging, to  
12 users of portable digital audio media players. Players include a wireless receiver to receive  
13 messages and memory for storage of messages. Alternatively, the memory may be pre-  
14 loaded with messages. A controller then plays messages between tracks of the audio disc,  
15 tape or other form of digital media being played.

16 In a preferred method, advertising or promotional messages are broadcast to  
17 capable digital audio media players via wireless transmission and stored in memory. The  
18 player reads control information on a medium and stores it in memory. The control  
19 information is used to play messages from memory at predetermined times, preferably  
20 between tracks. In a preferred embodiment, a player's micro controller creates and saves  
21 a Message Play Plan, utilizing the control information and information about messages stored  
22 in memory. The Message Play Plan controls when messages will be played between tracks  
23 and how many messages will be played. The Message Play Plan is executed while the digital  
24 medium is played.

25 An effective promotion method is enabled through the invention and use of a  
26 player capable of message reception, storage and play in accordance with the invention. A

1 promoter can arrange for the distribution of players, for free or at a reduced cost. An event,  
2 e.g., a festival or concert, provides a preferred circumstance to target a particular group of  
3 recipients of promotional or advertising messages. Promotional messaging that preferably  
4 comprises advertising is then broadcast to the distributed players, which store and play  
5 messages between tracks.

#### 6 BRIEF DESCRIPTION OF THE DRAWINGS

7 Other features and advantages will become apparent upon reading the  
8 following detailed description in which:

9 FIG. 1 is a block diagram illustrating preferred wireless messaging according  
10 to the invention;

11 FIG. 2 illustrates preferred message unit arrangements;

12 FIG. 3 is a block diagram of a preferred subcarrier message receiver of the  
13 invention;

14 FIG. 4 illustrates a preferred updateable message enabled disc player of the  
15 invention;

16 FIG. 5 illustrates a preferred message reception method of the invention;

17 FIG. 6 illustrates preferred steps for initiating a message play plan;

18 FIG. 7 illustrates preferred steps for creating a message play plan; and

19 FIG. 8 illustrates preferred steps for executing a message play plan.

#### 20 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

21 The invention provides messaging to users of portable digital audio devices.  
22 Digital media audio devices, e.g., CD or MD players, used by the invention must be modified  
23 from conventional devices to be capable of storing and playing messages at predetermined  
24 times during playback of digital media. Preferably, the devices are also modified to be  
25 capable of receiving messages to be stored and played back.  
26

1           The preferred digital media audio devices of the invention receive messaging  
2 by wireless signal transmission. This permits the messaging to vary as a function of time,  
3 geographic location, the reception frequency of the device, or channel selection, for example.  
4 Many types of wireless signaling methods may be used in accordance with the invention.  
5 Radio frequency transmissions provide a convenient medium for transmission of messaging  
6 to digital media audio devices of the invention. The new digital television (DTV) signals are  
7 also expected to provide bandwidth for data broadcasts which could be used for messaging.  
8 Other suitable wireless media include microwaves, infrared light, laser light and sound  
9 waves. Irrespective of the particular manner of wireless transmission selected, modulation  
10 and coding techniques add channels which can be utilized by the invention to provide  
11 different messaging to different digital media audio devices, or to enable a particular digital  
12 media audio device of the invention to select between multiple messaging channels. Pre-  
13 loading messages into device memory also is effective for messaging, but does not permit  
14 the convenient updating of messages provided by wireless reception.

15           A portable digital audio media player, e.g., a disc player, equipped to receive  
16 store and play messages according to the invention will be referred to herein as an  
17 Updateable Message Enabled Player (UMEP). A UMEP may be pre-programmed to a  
18 particular messaging channel. UMEPs having different reception channels may be  
19 distributed to different targeted groups of message recipients.

20           A preferred embodiment of the invention uses commercial AM or FM radio  
21 subcarrier signals as messaging channels. The remaining portion of the detailed description  
22 will be directed to the preferred embodiment. Artisans will appreciate that other wireless  
23 signals may be used in a like manner, however.

24           The preferred sub-carrier channel is outside the baseband of commercial FM  
25 or AM transmission and provides a practical means for broadcasting messaging content to  
26 handsets. The Subsidiary Communications Authority, also known as a sub-carrier, sideband,  
27 SCA band, or SCA (sub-carrier) is a separate, nonbaseband audio or data signal which is

1 multiplexed onto the carrier (baseband) audio signal over a broadcast FM or AM radio  
2 station. Radio stations typically dedicate transmission power to one or two sub-carrier  
3 channels in addition to their main signal. No FCC authorization, notice, or application of  
4 license is required by the broadcast station to transmit a sub-carrier signal. 47 CFR § 73.127  
5 (AM stations), 47 CFR 73.293 (FM stations). FM sub-carriers are required to be in the 20  
6 to 99 kHz range when monophonic programs are broadcast and in the 52 to 99 kHz range  
7 when stereophonic programs are broadcast.

8 The preferred type of message content is promotional, e.g., advertisement  
9 messages. These messages might include samples of music. It is contemplated, however,  
10 that other types of messages may be broadcast such as: travel and traffic information, news,  
11 hazard warnings, etc.

12 Referring now to FIG. 1, promotional messages are created and prepared for  
13 broadcast 10. The messages may be digital or analog and may be compressed and otherwise  
14 encoded. The messages are broadcast 12 over the preferred commercial radio sub-carrier  
15 signal. The messages are received, stored and played 14 by UMEPs within the broadcast area  
16 of subcarrier transmission. Each transmission updates messages stored in a message  
17 memory of an individual UMEP. As previously mentioned, wireless transmission may be  
18 skipped if the invention is utilized by pre-loading messages into player memories, but the  
19 updateable broadcast is preferred.

20 It is expected that the messages will be produced in a recording studio. The  
21 messages will be recorded and, if necessary, compressed. FIG. 2 illustrates a preferred  
22 message structure. Messages may be of varying lengths. Each message structure includes  
23 a start code 18, message block 20 and an end code 22. The start code, message block and  
24 end code make up a message unit 24A(long) or 24B (short). Messages may be organized  
25 into groups for broadcast on different channels, at different times, in different geographic  
26 regions, etc. The messages also might include an additional database code to indicate the

1 type of message, such that messages can be matched to music content to tailor the type of  
2 message to be played based upon the type of music which is being played.

3 According to the preferred embodiment of the invention, UMEPs include a  
4 sub-carrier receiver module, as seen in the FIG. 3 block diagram for a preferred sub-carrier  
5 receiver. Sub-carrier message broadcasts impinge upon an antenna 26, and the signals are  
6 demodulated by an appropriate demodulator 28, which may be AM or FM. The signal from  
7 the demodulator is sent to a channel selector and conditioner 30, which selects the sub-carrier  
8 message channel and prepares the signal, e.g., amplifies, for decoding by a decoder. An  
9 analog to digital converter 32 converts the message to digital form. The converter 32 is only  
10 required where an analog subcarrier signal is used for message transmission. Message data  
11 from the converter 32, or the channel selector 30 if no converter is necessary, is decoded by  
12 a decoder 34. Preferably, the decoder 34 includes a small amount of short term memory to  
13 temporarily store decoded messages. Such short term storage permits a CPU or controller  
14 board 36 to manage its long term memory in the event that a newly received message would  
15 cause a memory overflow. A newly decoded message, after any required long term memory  
16 management, is sent to long term memory associated with the controller 36, which serves as  
17 a message memory from which a message is played. The decoder 34 may be realized as part  
18 of the CPU or controller 36.

19 The channel selector 30 is preferably adjustable so that a UMEP including the  
20 sub-carrier messaging receiver may receive messages at different frequencies and  
21 modulations. This feature can be used to support different types of messaging contents on  
22 separate channels that can be selected by a user, selectively controlled by the controller 36  
23 without user input, set at the time of manufacture, or set by dealers or technicians. The  
24 channel selector 30 may scan frequencies, may be directed to a frequency by a received  
25 control signal, or it may be set by a switch or other type of selector. The FIG. 3 receiver may  
26 also contain a digital signal processor (DSP) as a separate module or a function of the  
27 controller 36 if it is necessary to decompress or otherwise process received messages prior

1 to storage or playing. It is preferred that the sub-carrier receiver be continually powered so  
2 that it is always enabled to receive message broadcasts, and accordingly, it should exhibit low  
3 power consumption.

4 A preferred UMEP including a subcarrier receiver module 38 constructed in  
5 accordance with FIG. 3 is shown in block form in FIG. 4. The FIG. 4 UMEP is a disc  
6 player, e.g., CD player. A disc player module 40 is completely conventional. Both modules  
7 are mounted on a main circuit board 42. The board 42 may be constructed so that both  
8 modules are integral to the board or in a way that permits the sub-carrier receiver module  
9 38 to be present or not. This latter type of board construction permits the same board to be  
10 used for players that may be built without the sub-carrier receiver module.

11 The receiver module 38 and disc player module 40 preferably share some  
12 common components, including a power supply 44, DAC (digital to analog converter)/audio  
13 synthesizer 46, user interface 48, display 50, and audio output 52. The interaction between  
14 the modules and their use of common components is regulated by interface control circuitry  
15 54. The interface control circuitry 54 may be part of the sub-carrier receiver module 38 so  
16 that it will not be present on the main board if the sub-carrier receiver module is not included.  
17 The interface control circuitry allows the disc player module 40 to receive input from the user  
18 interface 48, e.g., "stop", "start", "skip", volume control, etc. The display indicates such  
19 things as track number and duration. The interface control will also regulate access to the  
20 audio synthesizer 46. Preferably, the subcarrier receiver module 38 receives priority, so that  
21 its access to the synthesizer 46 pauses play of a track from the disc player module 40.

22 FIG. 5 illustrates a preferred transmission and reception procedure executed  
23 with a broadcast and a UMEP for reception of messages according to the invention. A digital  
24 FM message broadcast is assumed in FIG. 5. A step for analog to digital conversion would  
25 be added to the FIG. 5 procedure if an analog messaging broadcast is utilized. In FIG. 5, a  
26 message is modulated onto the baseband signal of a digital FM broadcast and transmitted 56.  
27 The message is received and processed 58 by the sub-carrier receiver module 38 of a UMEP.

1 The demodulated, audio or text message is sent 60 to short-term memory in the sub-carrier  
2 receiver module 38. The receiver module 38 should also contain enough long-term memory  
3 to hold and play a reasonable number of different messages between times when new  
4 messages are received.

5 The long-term memory may be full when a new message is received.  
6 Preferably, the controller 36 checks 62 to see if there is sufficient unused long-term memory  
7 referred to as Memory A, available to store new messages. If there is insufficient memory,  
8 the oldest messages are deleted 64 until enough space exists. When sufficient long-term  
9 memory is made available, the messages will be transferred from short-term memory to the  
10 long-term memory and stored 66 in sequential order based on when the messages were  
11 received.

12 Stored messages may be played from long term memory. Preferably, a plan is  
13 created. FIG. 6 illustrates a preferred timing for initiation of a Message Play Plan (MPP) that  
14 is created by the micro controller 36 in the UMEP disc player. The MPP determines when,  
15 how many and which messages will be played. The context of a user listening to the disc is  
16 utilized by the MPP to determine when a message should be played from memory. Thus, the  
17 process begins when the user turns on the player or loads 68 a disc. The micro controller  
18 queries the disk and reads 70 TOC and other control code data from the disc. This TOC and  
19 other control code data is stored 72 in memory, referred to as memory B. The MPP is  
20 created, as outlined in FIG. 7, and stored 76 in memory, referred to as memory C. The disc  
21 is played and the MPP is executed 78 as outlined in FIG. 8. The MPP stops when the player  
22 is turned off or the disk removed 80. Turning off the player or removing the disk also erases  
23 81 memory B and C that, respectively, contain the TOC and sub-code data, and the MPP.  
24 The MPP process starts again when the player is turned on or a new disc loaded.

25 FIG. 7 illustrates steps in a preferred MPP. The MPP begins 82 after the  
26 controller 36 has stored the TOC and sub-code memory B. The controller 36 checks 84 the  
27 number of messages that are stored in memory A. The controller 36 then determines 86



1 which tracks will have messages played between them. The determination of which tracks  
2 will trigger messages to be played should be somewhat random to prevent a listener from  
3 being able to anticipate and bypass a message. It may be desirable, though, to always play  
4 a message either before the first track, after the first track, or after the second track to  
5 maximize the chance that a listener will hear a message during every listening session, even  
6 short ones. The controller 36 next determines 88, based on how many messages are stored  
7 in memory A and how many message breaks have been determined, the number of messages  
8 to-play at each break. The determination of the number of messages to play may also include  
9 an intelligent selection of which messages to play. A way to determine the type of messages  
10 to be played is to link the type of messages to the content of the music track which was  
11 played or will be played. Typical digital media include track titles in code information on  
12 the digital media, such as the TOC on a CD. This provides an opportunity to base the  
13 message played upon the type of music. For example, if the music file belongs to a certain  
14 music category, the message structure can be set up to play a specific message for each music  
15 category. This way, the choice of messages played can match more closely with the listener's  
16 taste as it is reflected by the music category, which adds an additional and powerful  
17 dimension in the customization of advertisements to listeners. In such a case, the MPP would  
18 include information linking tracks to particular types of messages. A completed MPP is  
19 stored 90 in memory C.

20 FIG. 8 details a preferred sequence for launching a stored MPP during playback  
21 of a disc. The controller identifies 92 the next track on the disc through use of control codes  
22 while the prior track is being played, or immediately upon its conclusion. The ID number  
23 of the identified next track is compared 94 to the MPP. The MPP is queried 96 to determine  
24 whether a message is to be played before the identified next track. If the answer is no, the  
25 track is played 98 and the next track is identified 92. If the answer is yes, the MPP is queried  
26 100 for how many messages are to be played. The MPP also may return information on  
27 which messages are to be played based upon the track to be played or the track which was

1 played. The appropriate number and ones of messages are then pulled 102 from memory A  
2 and played 104. Following the messages, the track is played 98, and the sequence begins  
3 anew to identify the next track 92.

4 From the preferred embodiment, artisans will appreciate various advantages  
5 of the invention and that modifications may be made to the invention without departing from  
6 the scope of the invention. The invention permits advertising or promotional messages to  
7 be broadcast to digital audio media players via wireless transmission. Received messages  
8 are stored by capable UMEP devices and stored messages are played through the audio  
9 output of the UMEP devices.

10 The general features of the preferred embodiment and variations thereof also  
11 provide a unique promotion method. Advertisers are especially interested in targeting their  
12 messages to particular audiences. The demographics of CD users provides a basis for  
13 targeting the users to particular advertising messages. For example, people who use portable  
14 disc players tend to be heavy CD purchasers. Accordingly, the invention offers record  
15 companies and their advertisers the opportunity to get their message to this highly desirable  
16 group of CD listeners.

17 A preferred embodiment record company promotion method has a UMEP  
18 messaging provider contract with a recording company. This method could apply, however,  
19 to any advertiser who wants to reach people who use portable disc players. The provider  
20 produces or arranges for the production UMEPs, that preferably prominently displays the  
21 logo, name, etc. of a recording company, recording, band, concert, etc. The UMEPs are then  
22 distributed to the targeted audience. In a preferred embodiment, UMEPs are given away for  
23 free or for a nominal charge as a tie-in to a related purchase (e.g., concert tickets, CD's,  
24 clothing, etc.). The provider then broadcasts messages to the sub-carrier enabled disc players  
25 that promote the recording company, recording, band, concert, etc. These messages  
26 preferably include samples of music, since the UMEP is well suited to present such samples.  
27 The provider maintains the message broadcasts to the disc players for a defined period of

1 time after which they stop. The provider might then provide the same service to another  
2 company, such as a clothing company, assuming that the original contract does not prohibit  
3 such messaging to the UMEPs distributed by an initial agreement. Messages can be  
4 broadcast to a select group of players by either coding the messages, broadcasting different  
5 messages over different frequencies or modulations and equipping certain players to receive  
6 the selected frequency or modulation.

7 While various embodiments of the present invention have been shown and  
8 described, it should be understood that other modifications, substitutions and alternatives are  
9 apparent to one of ordinary skill in the art. Such modifications, substitutions and alternatives  
10 can be made without departing from the spirit and scope of the invention, which should be  
11 determined from the appended claims.

12 Various features of the invention are set forth in the appended claims.